

A NOTE ON *METANASTRIA HYRTACA* CRAM.

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INTRODUCTION.

Of the members of the family *Lasiocampidæ* very few are serious pests of cultivated crops in South India. *Taragama siva* and *Trabala vishnu* are the only two, appearing occasionally in large numbers and doing appreciable damage to economic plants; and even these are rather rare. *Metanastria hyrtaca* probably comes third in the list. In the year 1934 this insect appeared in large numbers and the caterpillars almost completely defoliated a few Sapota plants in the orchard of the Central Farm of the Agricultural Research Institute at Coimbatore. The following is a short account of the observations made by the authors at that time.

THE MOTH.

The adult moth is fairly big with grey brown wings and rather thick-set body. The male is smaller than the female, has pectinate antennæ and has a black patch on the forewing with a white spot in the centre of it. The abdomen is long and slender and extends behind beyond the wings and has a brush of long hairs at its end. In the female the wings are longer and broader and have short wavy lines or bands across them; the black patch on the forewing is absent. The antennæ are thinner and smaller. The moths are sluggish and do not fly.

Hampson in *Fauna of British India*, 'Moths', Vol. I. gives the following description of the moth on page 410:

'Male: Pale or dark red brown; palpi dark below. Forewing with two ante-medial pale lines and two post-medial angulated lines, with an almost black patch between the upper part of the ante- and post-medial lines crossed by the pale veins and with a white lunule on it; a lunulate sub-marginal line. Underside of the hind wing with two pale lines.

'Female: Forewing with the two ante-medial and the two post-medial lines more distinct and without the dark patch and white lunule; the sub-marginal lunulate line very indistinct. Hind wings with an indistinct pale line.'

Moore's *Lepidoptera of Ceylon*, Vol. II, page 148 has the following description of the moth:

'Dark purplish ferruginous. Male: Forewing with a transverse ante-medial and a post-medial slightly waved ferruginous-grey line, and two similar medial lines, the outer one being convexly angular beyond the cell; between the two lateral lines is a dark purple brown patch extending from the costa to the lower median vein, this patch being marked by a pure white lobate spot; exterior border darker, crossed by a very indistinct submarginal row of dark brown speckled spots. Female: Forewing with four similar transverse ferruginous grey equidistant lines; the basal area between the medial lines, and the outer border darker coloured, the submarginal row of spots more distinct and grey speckled. Front of thorax, head, palpi and antennæ greyish ferruginous. Expanse: Male $1\frac{7}{8}$ in. Female 3 in.'

LIFE HISTORY.

The moths copulate the very next day after emerging from the pupæ and the female lays eggs in groups or rows on the surface of the leaves or twigs of the food plant. Each female is capable of laying about 140 eggs, which it does in several batches in the course of two or three days. The eggs hatch in nine to twelve days. The caterpillars are active from the second day and lead a gregarious life. They move about on the leaves and stem in single file. They feed on the tender leaves by scraping the surface for three to five days and then undergo the first moult. There are generally six or seven moults during the caterpillar stage, though, in exceptional cases, the number may go up to ten or be reduced to four; but there is no marked change in them after the fifth moult. Just before moulting the caterpillars remain motionless on the stem or the leaf, having ceased feeding a day or two earlier. In the actual process of moulting the head shield is first pushed forward by the formation of fresh growth below and gradually gets detached; this is followed by the rupture of the outer skin all along the body and the caterpillar emerging out of the larval skin, which is often left almost entire. The new larva is smaller in size but regains the normal size in a short time. The caterpillars feed voraciously, and become full grown in 45 to 60 days. The larval period may be reduced to 43 and increased to over 100 days in rare cases. A few prolong their larval period by cessation of growth for a long time after the fourth moult, so that in the same brood some caterpillars grow in advance of others, a good number lagging behind. The full grown caterpillars construct loose cocoons of silk inter-woven with hairs from their bodies and pupate inside. The cocoons are generally attached to the stem or leaf; and often two or more cocoons are found grouped together. The pupal period varies from 9 to 18 days. Thus, the whole life cycle from egg to adult takes 75 to 109 days depending on weather and other conditions.

Egg: The egg is spherical in shape and about $1\frac{1}{2}$ mm. in diameter, i.e., about the size of a mustard seed. It is dull white

in colour with two big brownish black round markings and a smaller one between. It is covered with dirty grey irregular faint markings making the colour appear ashy grey at a distance. The shell is hard and finely sculptured on the surface.

Larva (1st stage): The newly hatched larva is about $2\frac{1}{2}$ mm. long with the head $7/10$ mm. broad. The segments of the head and the thorax are slightly bigger than the remaining segments so that the body appears to taper slightly towards the hind end. The head is black and covered with minute hairs. Segment I is blackish with a dorsal prothoracic chitinous shield bounded by a thin greyish white area. This is separated from segment II by a double ring, greyish pale white in colour with a black transverse streak in the middle. The three thoracic segments have a fairly broad dorso-median longitudinal blackish grey band with a central whitish area or streak which broadens towards the third segment. Each segment has on the ventral side a pair of well developed black legs covered with minute velvety hairs. The abdomen is black with the dorsal side of the first three segments slightly greyish as a continuation of the thoracic longitudinal streak. The greyish colour is interrupted by the inter-segmental rings which are dirty pale white. On the ventral side are the four pairs of brownish black slender prolegs on the third to the sixth abdominal segments and a fifth pair on the last or anal segment. The whole body of the caterpillar is covered with numerous hairs arising singly or in tufts from black tubercles. On the prothorax are a large number of long hairs directed forwards and sideways. The spiracles are seen as small dots on the sides of the body on segment I and the first eight segments of the abdomen, the first pair being slightly bigger than the rest. The caterpillar leads a very active and gregarious life, feeding on the tender leaves for three to five days and attains a length of nearly 6 mm. Then it ceases feeding and undergoes the first moult.

Larva (2nd stage): The caterpillar is now about 8 mm. long. The thoracic segments are only slightly broader than the rest of the body and the anterior portion appears a little tapering as the head is narrower than the thoracic segments. The head is blackish with three slight ashy grey bands extending from the prothoracic region down to the clypeus. There are a large number of short hairs arising from the head near the jaws. The dorsal side of the prothorax is black with a pair of light grey longitudinal bands on either side of the median line. The black chitinised area is bounded by greyish brown patches in front and behind; and there are more irregular patches on the sides. The prothoracic processes are short, thick and black with numerous short soft whitish hairs extending forward. Some of these hairs are black or brownish. In the prothorax are also numerous isolated smaller and thinner brown hairs along the middle frontal fringe, the sides and the posterior edges. The mesothorax is black with greyish brown mottlings; the dorsal tubercle on each side of the median line is bluish black covered with short irregular hairs; two small erect groups of hairs are found on the dorsal side of the segment marking the position of the transverse groove. Segment III is greyish

brown with irregular black spots and patches and with bluish black tubercles. Towards the posterior end of the segment a transverse slit is visible, its inner sides are lined with very minute shining velvety hairs of a brick red colour. In the abdominal segments the mid-dorsal double line of the previous stage is broken up into irregular ash coloured mottlings and the lateral whitish bands are continued behind upto the eighth segment. The first two segments appear greyish brown and the rest are darker. The eighth, ninth and tenth segments are black with white thick intersegmental transverse patches or rings. The abdominal tubercles are bluish black and more prominent with blackish hairs arising from them. One sub-dorsal and one ventro-lateral row of tubercles are seen on each side of the body, the latter row being on short blunt protuberances of the skin on the sides. The whole body is covered with irregularly distributed short brown hairs. The hairs on the sub-dorsal tubercles arise erect while those on the ventro-lateral tubercles are directed sideways. They are directed forwards in the anterior segments and backwards in the posterior or anal segment. The prolegs which are more conspicuous than in the previous stage are slender, long, pale red, and are beset with numerous small hairs.

The caterpillar during this stage is more active and feeds voraciously. It grows to a size of 10 or 11 mm. in the course of 4 to 6 days and then undergoes the second moult.

Larva (3rd stage): The average caterpillar is about 16 mm. long. It is black grey with reddish and brown dots and pale white streaks irregularly distributed over the body. The newly moulted caterpillar has its head as broad as the thorax so that there is no tapering towards the head as in the previous stage. The head, the first and second segments of the thorax, and the eighth, ninth and tenth abdominal segments are black and separated from their neighbouring segments by whitish double transverse bands. The three whitish grey bands of the first thoracic segment are continued into the head region. The prothoracic processes are more pronounced with tufts of hairs. Over the second thoracic segment the paired tufts of small hairs on the mid-dorsal line, one behind the other, enclose between them a transverse depression which is lined black. The third thoracic segment has the red streak more pronounced and the posterior border of the segment is whitish as a distinct transverse band. Similarly between segments 4, 5 and 7 and 8 whitish transverse bands appear borne on the posterior border of the one and the anterior border of the following segment. Segment 8 is black and bears a somewhat conspicuous pair of dorsal tubercles more prominent than others. Segments 9 and 10 and the legs are black. The prolegs are yellowish with a black patch on the outer side. The spiracles are white vertically oval spots with black borders situated in a line on the sides of the body wall. The ventro-lateral processes from the body wall are more prominent with denser and longer hairs. The hairs are of varying length, shape and shade; they are at first whitish turning brown or brownish black later on. The hairs on the dorsal side of the body are generally shorter than the rest. The ventral side of the body is blackish or of cement colour.

The caterpillar feeds gregariously and grows to about 20-22 mm. and, as it grows, the head appears a little narrower than the body. The white central band in the region of the head bifurcates near the front and three more parallel lines of whitish tinge on each epicranium extend down to the ocellar region the one next to the central streak being more prominent than the others. It is not uncommon to find caterpillars at this stage reaching a length of 30-40 mm.

Larva (4th stage): Immediately after emerging from the moult the caterpillar is 25-40 mm. long. The brown colour of the hairs on the surface of the body becomes more pronounced. Secondary hairs appear all over the body, the base of the legs, the prolegs and the head, making the tubercles rarely visible. The erect comb-like hairs over segment II and the lateral hair groups on the ventro-lateral processes on the body are more prominent than in the previous stage. Besides the soft hairs there are also whitish or yellowish brown shorter flattened spatulate hairs arising in the midst of the ventro-lateral tufts. Segment III is the biggest and the thoracic segments are progressively smaller anteriorly, with the head appearing smallest. The dorsal bands on the thorax are darker and are continued into the head region. The general colour is greyish brown with irregular mottlings, simulating the bark of the stem of the food plant. Beyond this stage the caterpillars show no marked changes except in size. They remain on the stem in groups closely packed together. Some of the larvæ moult at the end of 5 to 7 days and reach a size of nearly 40-50 mm. But the length of this stage and the size of the larvæ at the end of it vary greatly.

Larva (5th stage): This is generally the last stage in the growth of the larva, the caterpillar becoming full grown at its end. Beginning with a size of nearly 40 mm. it finally reaches about 65 mm. The body is stout and hairy and is cylindrical though slightly flattened on the ventral side. The head is small when compared with the other segments of the body, and black with whitish, brownish and dark bands. A dorso-median brownish band extends from the erect mid-dorsal tufts on segment II over the thorax into the head region and merges with the colour pattern of the head. The ad-frontal area is whitish and is in continuation of the central white streak on the cranial suture. The front is small and black. The ocelli are black and surrounded by brownish black patches at the sides. Numerous small brownish soft hairs are found over the head and mouth region. The skin of the body is tough and leathery beset with various kinds of hairs. The general colour varies, being greyish black or greyish dark brown. The hairs are of different colours and sizes. The longest hairs, found in bunches rising from the ventro-lateral body processes are soft and brownish. Some of the hairs rising from bluish black tubercles on the dorsal surface are fairly long and spike-like, are easily detached from the body and run into the fingers of the operator when the caterpillars are handled. Thinner, shorter and greyish dark hairs are seen in the region of the thoracic segments, legs, prolegs, lateral processes and posterior ends. A few yellowish

white spatulate hair-like structures arise in front of the dorsal tuft in segment II and irregularly in the midst of the lateral tufts in all the segments. Several groups of very soft minute hairs are found in the dorsal transverse grooves in segments II and III and in the intersegmental areas on the dorsal side. The ventro-lateral processes from the body wall are more prominent and the tufts of hairs are directed forwards in thoracic segments, horizontally over the sub-stratum in the abdominal region and backwards in the posterior segments. The latero-ventral processes on the prothorax are very long and thickset with hairs. These processes simulate prolegs and hide the true legs when viewed from above. The dorsal setae are comparatively small and reduced. In segment II the transverse cleft of skin placed dorsally about the middle of the segment exposes a jet black area bounded in front by a short tuft of whitish yellow hairs and behind by a shorter erect tuft of black hairs. In segment III the transverse slit placed about the posterior third of the segment, is broader and longer, extending to the sides and exposes a crimson red surface with a black streak in the middle. The skin in the slit is lined by very minute hairs and is smooth. The slit is exposed to view with its vivid colouration when the caterpillar is disturbed. The legs are black, well chitinised and covered with numerous hairs. The abdomen is long and stout with tufts of hairs on the sides. The dorsal hairs and setae are reduced in number and size. There are two pairs of bluish black tubercles on each segment; the front pair are subdorsal and the hind pair posterior-lateral in position. In the mid-dorsal region two blackish brown bands begin to appear in some specimens and this band is produced into angular projections outwards in segments III to VIII. In some specimens a lateral pale grey streak continued from the first to the eighth abdominal segment appears as a faint band and persists during the later stages of the caterpillar. The prolegs are long and slender with the crotchets biordinal and arranged in meso-series. The spiracles are clearly seen as long vertical slits, more or less oval in shape, whitish in the centre and bounded by a thick black rim enclosing a thin black streak in the central line; the spiracle in segment I is the biggest and that on segment VIII bigger than the rest; they are located on the sides, just above the region of the ventro-lateral processes.

Pupa: When full grown the caterpillars construct loose cocoons of silk interwoven with hairs detached from their bodies and pupate inside. The cocoon is generally attached to the stem or leaf and often two or more are found grouped together. The pupa is dark brown and covered with numerous short hairs irregularly distributed in front, but in rows round the pupa behind. The moth emerges by splitting open the pupal skin at the dorso-median anterior end. The pupal period lasts from 9 to 18 days.

OTHER FOOD PLANTS.

The caterpillars which are characteristic in their appearance and habits and are easily distinguished from others have been recorded to breed on *Guazuma tomentosa* H.B. & K., *Terminalia catappa*

Linn. (Country almond), *Mimusops elengi* Linn., *Nyctanthes Arbor-tristis* Linn. (Tam. Pavizha mall), *Bassia longifolia* Linn. (Tam. Iluppai), *Schima Wallichii* Choisy, *Eugenia Jambolana* Lam., *Acacia arabica* Willd., *Albizia stipulata* Boiv., and *Anthocephalus morindaefolius* Korth.

REMEDIAL MEASURES.

As already pointed out the insect has not been noted to be a serious economic pest and as such no elaborate arrangements are necessary for its control. But if and when it becomes a pest, the gregarious nature of the caterpillars makes it easy to handpick and destroy them. In more severe cases a stomach poison may be tried.

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EXPLANATION OF PLATE.

1. A leaf showing eggs on it.
2. One egg magnified.
3. A young caterpillar.
4. A full grown caterpillar.
5. The anterior portion of a grown up caterpillar showing the hairs.
6. Cocoon on a leaf.
7. Pupa.
8. Moth (female).
9. Moth (male).